A Survey on Usage of Mobile Video in Australia

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ABSTRACT
The growth of powerful entertainment functions of mobile devices, in particular mobile video, has recently attracted much attention. Studies on mobile TV, one form of mobile video, have been conducted in many countries. However, little research focuses on the holistic usage of mobile video. To understand the features of such usage, we conducted an online survey in Brisbane, Australia, during the first half of 2010. Our findings reveal similarities and diversities between usage of mobile TV in particular and mobile video on the whole.. The results could aid in improving the design of future studies, with a view to ultimately increase user satisfaction.

Author Keywords
Mobile video, mobile TV, usage, Australia, survey.

ACM Classification Keywords
H.5.m Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Mobile devices with powerful entertainment functions are rapidly growing in popularity. Viewing videos on such devices has especially received great attention. Video on mobile devices, so-called *mobile video*, in this paper, refers to all kinds of video services supplied through wireless networks and consumed with mobile terminal devices. It comes in two main forms: one is downloaded (and stored) for viewing at one's convenience; the other is streamed content in real time. Mobile TV mainly belongs to the second form, allowing TV programs to be streamed to subscribers using DMB or DVB techniques.

A promising mobile video service, mobile TV has been launched in many countries across Asia, Europe, America, and Oceania. Many related user studies have provided insight into consumer use of mobile TV [2-5, 8]. However, two key issues were overlooked. Firstly, there is no efficient study including other forms of mobile video. Though mobile TV and mobile video have much in common, mobile video has a bigger extension, so it is not appropriate to conflate it with mobile TV. Secondly, participant types have been limited. Most existing studies were based on mobile TV trials. Consequently, involved participants were mobile TV users. Such studies cannot include the opinions of non-users.

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Contrasting the findings of previous studies, the effect of region and culture should be obvious. In Australia, the commercial and technical trials of mobile TV have run since 2005 [2]. Despite some trial findings, how people generally regard the usage of mobile video and mobile TV in Australia is unclear.

To address issue of inclusivity, we conducted an online survey about mobile video usage in the city of Brisbane to more indicatively investigate attitudes, usage, and other issues related to mobile video and TV. We compare out results with those of other studies and discuss several important aspects with regard to improving mobile video experience in general.

PREVIOUS RESEARCH
A number of user studies on Mobile TV have been conducted in different countries such as Finland, Belgium, Germany, Japan, Korea, UK and US. These studies mainly focused on the usage of Mobile TV and users' demands. As Buchinger et al. [3] argued, the use of Mobile TV was strongly influenced by different cultures and life styles. A study in Belgium [9] found that people tended to use mobile TV at home rather than on the move; however, the study in Japan [6] stated that main consumption of mobile TV was on the go. Studies in Finland [8] and South Korea [5] addressed that home, commute, and short waiting time were the main contexts for using Mobile TV.

Through tracking mobile TV users' routines, some researchers found that most users consumed mobile TV between 5 and 40 minutes of mobile TV per day [2, 7]. Taking the characteristics of the preferable content into consideration, a number of studies consistently indicate that news, a concise, up-to-date and focused video type, is the most popular content of mobile TV [5, 8]. However, in terms of the Australian trial [2], the most popular genres were entertainment, news and documentaries.

As Mobile TV is one of important services of mobile video, some conclusions drawn from the relative research might be applied to mobile video. Nevertheless, due to its wider coverage, mobile video may have unique features differing from mobile TV. Unfortunately, only a few studies noticed the difference. A quality user study conducted by Miyauchi et al. [6] in Japan presented the contrasts between the usage of mobile TV and mobile video. They claimed that compared to mobile TV users, mobile video users watched self-development content during commuting time; were less often to watch videos at home; seldom shared experience; and were not interested in live videos.

From the previous research it can be seen that studies on mobile video is inadequate due to the fact that most research is based on the existing mobile TV service. Furthermore, since different culture backgrounds can yield various results, it is necessary to conduct a study to explore the usage of mobile video in Australia.

ONLINE SURVEY DESIGN

We proposed the survey aiming to investigate user's behaviour of using mobile video and the reasons why people in Australian are willing and unwilling to use mobile video. The online survey was developed with the Keysurvey tool (http://www.keysurvey.com/) and published for public. Avoiding overburdening the participants, we created a total 20 questions, which consist of three aspects: personal information (4 questions), experience in mobile video (8 questions), and experience in Mobile TV (8 questions). The questionnaire design was based on our purpose and the reviews of previous studies on mobile TV. The personal information is collected to ensure the sample's diversity, which involves gender, age range, educational level, and experience in image/video processing. The experience in mobile video aims to find the common usage context, the preference to content, and the important issues concerned by users and non-users. The third aspect particularly focuses on why people use or not use Mobile TV in Australia.

RESULTS

The survey was conducted during the first half of 2010 in Brisbane city, Australia. After advertising it in uni and on street, totally 140 responses were obtained. McNemar's test was used to examine the differences between two nominal categories in the related data [1]. The statistical results and related analysis for mobile video and TV are addressed in the following.

Respondents

Respondents are gender balance and storied in four age groups: 26 are less than 20 years old, 88 are at age of 20-29; 16 are in the 30 to 39 group; and 10 are over 40. It is reasonable to see that most respondents are young people because they are the main force of tending to accept and use new technologies. Table 1 gives other features of respondent's profile, whereby the mobile video users are further classified based on whether they frequently watch mobile videos and whether they have used mobile videos for a long time.

Categories	Yes	No
Experience in image/video processing	38	102
Experience in mobile video use	67	73
• frequent users (>= once a week)	30	
• occasional users (< once a week)	37	
• Long-term user s(> one year)	39	
• Short-term users (<= one year)	28	
Experience in knowing mobile TV	74	66
Experience in mobile TV use	13	117

Table 1. Respondents' profiles

From the profile, it can be seen that 47.9% of respondents (67) have used mobile video. However, it must be noticed that the percents can only present young people (at age of 16-39) due to the fact that only 10 elder people attended the survey and none of them has used mobile video. In addition, although 52.8% of respondents have heard about mobile TV service, the data shows a very low usage rate of mobile TV (9.3%).

Mobile Video

Content types

The most popular contents are music (67.2%), news (43.3%), and movie (34.3%); followed by cartoon (23.9%), self-recording (22.4%), sports (20.9%) and drama (16.4%). While documentary video is the least popular content (9%).

Referring to the impacts of user profile on preferred content types, it can be observed that whether or not people use the mobile video frequently (more than once a week) and for a long time (> 1 year) does not influence the most favourite contents: music, news and movie. However, McNemar's tests revealed that compared to those who hardly watch mobile video, the frequent user are more likely to watch new and music videos, as they stand at 13% and 11% higher respectively ($p<.05$). Furthermore, long-term users are more willing to watch self-recording and sports videos than short-term users ($p<.05$), and the differences are over 20% and 11% respectively; whereas the drama video is over 21% more popular for short-term users than long-term users ($p<.05$).

Usage context

The usage context indicates that under what circumstances people will use mobile devices to watch videos. According to the data, the most common contexts of using mobile video are relaxation or entertainment at home (50.7%), waiting at bus/train station or airport (47.8%), waiting for friends/in line (44.8%), and travelling on public transportations (37.3%), respectively.

The results demonstrate that two major motivations of using mobile video are to consume time (76%) such as waiting for bus and friends and sitting on the bus, and to relax/entertain (65.7%) such as watching at home or during a short break and sharing with others.

In addition, frequent users are much more often watch mobile videos at bus/train station and on vehicles, comparing with occasional users, which are 31% and 17% higher respectively ($p<.05$). Similar pattern can be observed for long-term users (around 10% higher).

Concerned issues

Regarding to the concerned issues of mobile video, there are two questions to be considered: what issues the existing users think about and what issues prevent people from using it.

- Mobile video user's concerns

Mobile video users' concerns are shown in Figure 1. Except the item of attractive content (people can always choose what they are interested in to watch), the other important issues belong to two technical respects: video quality (i.e., how smooth and clear the video is) and bit

rate (i.e., how video file is compressed). The 9% of concerns about the run time of a video shows that people do not really care about how long the video is.

Analysing the influence of user's profile, we found that people who have more experience in mobile video (long-term and frequent users) paid more attention to the image resolution than people who have less experience ($p<.05$). In the well-experienced group, about 26% of people cared about image resolution; while in less-experienced group, only about 10.8% of people mentioned the issue. This case is related to another user profile, whether having experience in image/video processing. 21.7% of experienced users and 13.6% of non-experienced users regarded the resolution as a concern. It is probably true that the term – resolution is too technical.

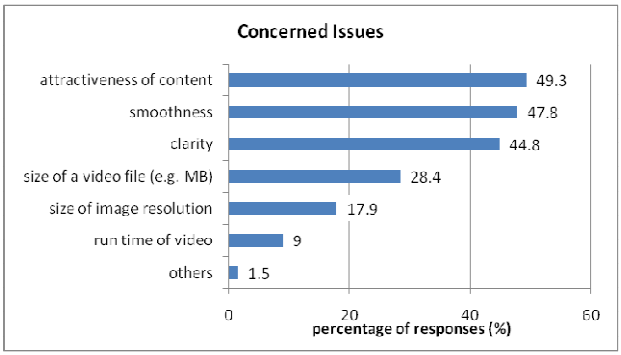

Figure 1. Concerned issues by mobile video users

- Non mobile video user's concerns

Disliking small screen (58.9%) and the convenience of using PC/laptop to watch videos (49.3%) are the most important reasons why people do not watch videos on their mobile phones. Apart from the impact of relative convenience, the fact that PC/laptop has a bigger screen than mobile phone which is preferred by users is in accordance to the first reason. Other important reasons include incapability of mobile phone in playing videos (34.9%), expensive mobile video service (27.4%), and poor video quality (21.9%).

Mobile TV

About half of responders (52.9%) heard about mobile TV in this investigation, but only 17.6% of who are aware have used this service, and almost half of the users used other countries' services such as Korean and Chinese Corps. It means only 9.5% of respondents who knew mobile TV have used Australian Mobile TV services. This number doesn't correspond to the real percentage of Australia mobile TV in market. However, it indicates that right now Mobile TV service is not very popular in Brisbane, which may be because of the late launch in Australia and the respondents as a predominance of men low-income young people.

Considering the potential development of mobile TV, we explored the people's attitudes to the future use of mobile TV. For the current mobile TV users, 61.5% were willing to continuously use the Mobile TV services; and for non-mobile TV users, 47.5% of them were willing to use in the future. The main reasons are shown in Table 2.

Reasons for willing use	Reasons for not using
Current Mobile TV users	
happy with current payment policy (50%)	unsatisfied video quality (60%)
happy with current service (37.5%)	unsmooth network transmission (25%)
good for entertainment and consuming time 37.5%	small screen (25%)
believe video quality will be getting better 37.5%	high cost (25%)
Non-Mobile TV users	
trying something (65.5%)	not interested in it (43.8%)
convenient to watch TV on a mobile phone (58.6%)	low service quality to price ratio (37.5%)
abundant and attractive content (48.3%)	unsatisfied with video quality (21.9%)
video quality will be better (27.6%) and price will be cheaper (24.1%)	limitation of a mobile phone to use (18.8%)

Table 2. Reasons of future using and not using

The both sides of reasons of use or not use mobile TV can be aggregated in four factors: convenience, user experience on small screen, quality and cost. These are basically consistent with people's expectations to mobile video, which mainly focus on smoothness, clarity, convenience in use, and cheap service.

DISCUSSION

In the survey results, we addressed several important aspects of mobile video, including typical content types and usage contexts, user profile's impacts, and the vital issues concerned by both users and non-users. This section will compare our results with other research's results to find out the consistency and difference and discuss some significant issues in details.

A high consistency between mobile video and mobile TV can be found in the following aspects:

- Young people are the primary mobile video users who are familiar with technologies build into mobile devices and interested in new technologies.
- Killing time and entertainment are the main motivations of using mobile videos.
- Home, bus/train station and transportation are the common usage contexts
- Video quality and content itself are the important concerns.

However, some unique features can be found in our study.

Content - Based on the votes, music video is the most popular content type for mobile video. It is congruous with the "*entertainment*" in Australia mobile TV trial, but conflicts with the result "news" in other countries' studies. It reveals a divergence between backgrounds. In our study, documentary got the least support, which far differs from the results of mobile TV [2, 4], where documentary is one of the most interesting. This situation may be caused by the difference in available content sources between mobile video and mobile TV. Moreover,

the importance of self-recorded videos should not be neglected in spite of not being supplied by mobile TV.

Motivation - O'Hara et al.'s research [7] pointed out that shared viewing experience was also a key motivation. However, an opposite conclusion is obtained from this study, which shows that only 7.5% of mobile video users in Australia use for the purpose of sharing. It confirms the finding in Japan [6].

Duration - Varying from previous studies on mobile TV which claimed that short video is preferred by mobile TV users [3, 4], the length is not a big problem for mobile video users. This probably is because the mobile TV users have to consider about the streaming cost and time and content continuity when each time they open the TV program; whereas for the stored video in a mobile phone, users can pause/stop watching at any time and re-watch it at any time. In another word, users may watch video in a short time does not mean that the video content has to be short.

Attitude - As for the people's attitude to the future use of mobile TV, an average 50% of respondents in this study were likely to use this service in the future, whereby the percent of current mobile TV users is 61.5% and higher than that of non-users (47.5%). This ratio is close to the result conducted by Siemens in 8 countries (February 2006), which indicates 59% of respondents were interested in Mobile TV [as cited in 4]. However, it is significantly lower than the commercial trail result in Sydney Australia 80%, in Germany 78% and in Korea 90%.

As far as the important issues are concerned, deeper discussion is necessary in helping improve the quality of mobile video and design further study on mobile video.

Firstly, as the principle reasons of whether or not people are willing to use mobile video, convenience of using a small device and experience of watching on a small screen are in contradiction. Yet, the implicit meaning behind this situation is that people haven't gained a viewing experience on a small screen as good as on a big one. Just as a respondent said: "*my expectation for mobile videos is that it should be a comparable experience to watching it on a normal TV screen, otherwise I would rather wait to watch TV*", the only way to increase the usage of mobile video is to improve users' viewing experience. There are two important facets – video quality and video content – can contribute to raise user experience of mobile videos based on the concerned issues. Abundant and flexible content are always attractive. And research on perceptual video quality is necessary to provide a perceived clear and smooth video at the same time to maintain a high compression ratio.

Secondly, to summarise the common usage contexts of mobile video, consuming waiting or commute time and relaxation/entertainment may correspond to two categories of usage scenarios: nervous scenario and relaxed scenario. The former refers to the scenario that people take another task into their minds when they are watching a video so that they cannot pay attention to the video (e.g., taking a bus and waiting for a bus). The later refers to the scenario that people are free to watch a video and can concentrate on the video content (e.g., at home and work break). Distinguishing the different scenarios is helpful of noticing the influence of context in the future research on optimising user experience of mobile video.

Finally, user profile's impacts are not only restricted in the aspects of age, gender, education background, but their previous experiences. The experienced users have a more positive attitude to the mobile video usage than users without much experience; and have different behaviours in favoured content types and usage contexts. We suggest carefully defining the subject's type for distinct user studies with different purposes.

CONCLUSIONS

This paper presents a local survey on mobile video usage conducted under the multicultural environment in Australia. The contributions of this paper rest with a comparative study between mobile video and mobile TV and an understanding of the crucial issues influencing the usage of mobile video. The results are also significant to instruct a further study of mobile video in Australia to ensure the proper selection of context and participants.

REFERENCES

Aron, A., Aron, E., & Coups, E. J. Statistics for psychology: Harlow: Pearson Education. (2009).

Broadcast Australia - Mobile TV Trials 2005 to 2009. http://www.dvb-h.org/Services/services-sydney.htm

Buchinger, S., Kriglstein, S., & Hlavacs, H. A comprehensive view on user studies: Survey and open issues for mobile TV. In Proc. 7th EuroITV. ACM Press (2009), 179-188.

Carlsson, C., & Walden, P. Mobile TV-to live or die by content. In Proc. 40th HICSS. IEEE (2007), 51-57.

Chipchase, J., Yanqing, C., & Jung, Y. Personal television: A qualitative study of mobile TV users in South Korea. In Proc. Mobile HCI 2006. (2006).

Miyauchi, K., Sugahara, T., & Oda, H. Relax or study?: A qualitative user study on the usage of Mobile TV and video. In Proc. 6th EuroITV. Springer (2008), 128-132.

O'Hara, K., Mitchell, A. S., & Vorbau, A. Consuming video on mobile devices. In Proc. CHI'07. ACM Press (2007), 857-866.

Södergård, C. Mobile television-technology and user experiences (No. 506): VTT Information Technology (2003).

Vangenck, M., Jacobs, A., Lievens, B., Vanhengel, E., & Pierson, J. Does mobile television challenge the dimension of viewing television? An explorative research on time, place and social context of the use of mobile television content. In Proc. 6th EuroITV. Springer (2008), 122-127.